

V Semester Syllabi –Mechanical Engineering

Sr.	Course Code	Course Name	L	T	P	Credits
1.	ME3CO11	Energy Conversion-II	3	1	2	5
2.	ME3CO12	Machine Design-II	3	0	2	4
3.	ME3CO13	Heat and Mass Transfer	3	1	2	5
4.		Program Elective V-1	3	0	0	3
5.		Program Elective V-2	3	0	0	3
6.	EN3MC02	Technical English	2	0	0	0
7.	EN3MC04	Human Values & Ethics	2	0	0	0
8.		Open Elective - V-1	3	0	0	3
		Total	22	2	6	23
		Total Contact Hours		30		

Program Electives

ME3EL01	Measurement & Instrumentation
ME3EC03	Finite Element Methods
ME3EE04	Power Plant Engineering
ME3EI02	Operations Research
ME3EM02	Electronic Devices and Circuits

Open Electives

OE00001	Statistical Signal Processing
OE00002	Neural Networks and Fuzzy Systems
OE00003	Industrial Electronics
OE00004	Electronics Engineering Materials
OE00005	Digital Electronics
OE00006	Basics of Entrepreneurship
OE00007	Mechanical Estimation and Costing
OE00008	Fundamentals of Service Marketing
OE00013	Photovoltaic System

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
ME3CO11	Energy Conversion-II	3	1	2	5

UNIT I

Introduction to Turbo machinery

Definition of turbo machine, parts of turbo machines, Comparison with positive displacement machines, Classification, application of first and second laws of thermodynamics to turbo machines, moment of momentum equation and Euler turbine equation, principles of impulse and reaction machines, degree of reaction,

UNIT II

Steam Turbines

Steam turbines, single stage impulse turbine (DeLaval Turbine), velocity triangles and calculation power, thrust and efficiency; pressure, velocity and pressure-velocity compounding, analysis of optimum blade speed, Curtis stage, and Rateau stage, effect of blade and nozzle losses on vane efficiency, stage efficiency, analysis for optimum efficiency, mass flow and blade height. Reaction turbines (Parson), degree of reaction, conditions for optimum efficiency, speed ratio, axial thrust, reheat factor in turbines, governing of turbines.

UNIT III

Hydraulic Turbines

Hydraulic Turbines, classification, Hydraulic, volumetric, mechanical and overall efficiencies, Pelton, Francis and Kaplan Turbines, their velocity triangles, calculation of power and efficiency and other performance parameters, draft tube and its applications, unit quantities, specific speed.

UNIT IV

Centrifugal Pumps

Centrifugal pumps, classification, advantage over reciprocating type, definition of manometric head, gross head, static head, vector diagram and work done. Main and operating characteristics of the machines, cavitations, priming of pumps, specific speed of pump

UNIT V

Blowers and Compressors

Root blowers, Vane type compressors, centrifugal compressors, vector diagrams and calculation of various parameters, axial compressors, vector diagrams and calculation of various parameters, applications of rotary compressors.

Text Books

1. R. Yadav, Steam and Gas Turbine, Central Pub.
2. M. M. Rathore, Thermal Engineering, TMH
3. R.K.Bansal, Fluid Mechanics & Fluid Machines, Lakshmi Pub.

Reference Books

1. V. Kadambi and M. Prasad, An introduction to EC Vol. III-Turbo machinery, Wiley Eastern.
2. B.K.Venkanna, Turbomachinery, PHI
3. K.L. Kumar, Fluid Mechanics, S. Chand Publishers.

List of Practicals

1. To conduct a test on Centrifugal Pump and plot its characteristics.
2. To conduct an experiment on Pelton turbine test rig.
3. To conduct an experiment on Francis turbine test rig.
4. To find the friction factor for flow through pipes.
5. To study the effect of a draft tube on reaction turbines.
6. To study the hydraulic controls rig.
7. To study the cavitations phenomenon in turbines.
8. To study the hydraulic couplings and torque converters.

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
ME3CO12	Machine Design-II	3	0	2	4

UNIT I

Journal Bearing: Types of lubrication, viscosity, hydrodynamic theory, design factors, temperature and viscosity considerations, Reynold's equation, stable and unstable operation, heat dissipation and thermal equilibrium, boundary lubrication, dimensionless numbers, Design of journal bearings, Rolling-element Bearings: Types of rolling contact bearing, bearing friction and power loss, bearing life; Radial, thrust & axial loads; Static & dynamic load capacities; Selection of ball and roller bearings.

UNIT II

Spur Helical and Bevel Gears: Force analysis of gear tooth, modes of failure, beam strength, Lewis equation, form factor, formative gear and virtual number of teeth; Gear materials; Surface strength and wear of teeth; strength against wear; Design of straight tooth spur and Helical Gears. Bevel Gears: Application of bevel, formative gear and virtual number of teeth; Force analysis; Lewis equation for bevel gears; Strength against wear.

UNIT III

Design of I.C. Engine Components: General design considerations in I C engines; design of cylinder; design of piston and piston-rings; design of connecting rod; design of crankshaft.

UNIT IV

Design of Brakes

Brakes: Various types of Brakes, band brakes. Self energizing condition of brakes, Design of shoe brakes Internal & external expanding.

UNIT V

Design of Clutches

Clutches: Various types of clutches in use, Design of friction clutches, Disc. Multidisc, Cone & Centrifugal, Torque transmitting capacity.

Text Books

1. J.E. Shigley, Machine Design, TMH
2. V. B. Bhandari, Design of Machine Elements, TMH
3. P.C. Sharma and D.K. Agrawal, Design of Machine Elements, S. K. Kataria & Sons Pub.

Reference Books

1. Hall, Holowenko, Laughlin , **Schaum's Outlines series**, Adapted by S. K. Somani, TMH.
2. Abdul Mubeen, Machine Design, Khanna Publishers.
3. Robert L. Norton, Design Of Machinery, TMH

List of Practicals

1. Design of Journal bearing.
2. Design and drawing of Roller bearing.
3. Design and drawing of Spur Gears.
4. Design and drawing of Helical Gears.
5. Design and drawing of Bevel Gears.
6. Design and drawing of Cylinder head and Piston.
7. Design and drawing of Connecting rod/Crankshaft.
8. Design and drawing of Single plate/Multiplate clutch.
9. Design and drawing of Centrifugal Clutch.
10. Design and drawing of Shoe Brakes.

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
ME3CO13	Heat and Mass Transfer	3	1	2	5

UNIT I

Conduction: Fourier heat conduction equation, its form in rectangular, cylindrical and spherical coordinates, thermal diffusivity, linear one-dimensional steady state conduction through a slab, tubes, spherical shells and composite structures, electrical analogies, critical-insulation-thickness for pipes, effect of variable thermal conductivity.

Unsteady heat conduction: Transient and periodic conduction, heating and cooling of bodies with known temperatures distribution, systems with infinite thermal conductivity.

UNIT II

Extended surfaces (Fins): Heat transfer from a straight and annular fin for a uniform cross section; error in measurement of temperature in a thermometer well, fin efficiency, fin effectiveness, applications.

UNIT III

Convection: Introduction, free and forced convection; principle of dimensional analysis, Buckingham 'pie' theorem, application of dimensional analysis of free and forced convection, empirical correlations for laminar and turbulent flow over flat plate and tubular geometry; calculation of convective heat transfer coefficient using data book.

UNIT IV

Heat exchangers: Types- parallel flow, counter flow; evaporator and condensers, overall heat transfers coefficient, fouling factors, long-mean temperature difference (LMTD), method of heat exchanger analysis, effectiveness of heat exchanger, NTU method.

Mass transfer: Fick's law, equi-molar diffusion, diffusion coefficient, analogy with heat transfer, diffusion of vapour in a stationary medium

UNIT V

Thermal radiation: Nature of radiation, emissive power, absorption, transmission, reflection and emission of radiation, Planck's distribution law, radiation from real surfaces; radiation heat exchange between black and gray surfaces, shape factor, analogical electrical network, radiation shields.

Text Books

1. S.P. Sukhatme, Heat and Mass Transfer, University Press Hyderabad
2. J.P. Holman, Heat Transfer, TMH
3. R. K. Rajput, Heat and Mass Transfer, S. Chand Pub.

Reference Books

1. Y Cengel, Heat and Mass Transfer, TMH
2. D.S. Kumar, Heat and Mass Transfer; S.K. Kataria and Sons.
3. P.K. Nag, Heat Transfer, TMH

List of Practicals

1. Determination of thermal resistance of a composite slab.
2. Determination of convective heat transfer coefficient in natural convection process.
3. Determination of thermal conductivity of insulating powder.
4. Determination of emissivity of a grey body.
5. Study of effect of thickness of insulation on heat transfer rate.
6. Determination of Stefan Boltzmann constant.
7. Determination of heat transfer through lagged pipe.
8. Determination of efficiency of pin fin.
9. Determination of thermal conductivity of metal rod.

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
ME3EI02	Program Elective (Operations Research)	3	0	0	3

UNIT I

Introduction: Definition and Development of Operations Research, Necessity and scope of OR in Industry, Operations Research in Decision making, Models in OR, Fields of application, Difficulties and Limitation of OR. General Linear Programming Problems: Introduction, Maximization and minimization of function with or without Constraints, Formulation of a linear programming problem, Graphical method and Simplex method, Big M method, Degeneracy, Application of Linear Programming (LPP) in Mechanical Engineering.

UNIT II

Transportation Problems: Mathematical formulation, Stepping stone method, Modified Distribution Method, Vogel's Approximation Method, Solution of balanced and unbalanced transportation problems and case of Degeneracy.

Assignment Problems; Mathematical formulation of assignment problems, Solution of assignment problems, Traveling salesman problems, Air crew Assignment problems.

UNIT III

Waiting Line Theory: Basic queuing process, Basic structure of queuing models, Some commonly known queuing situations, Kendall's notation, Solution to M/M/1: ∞ /FCFS models. **Network Analysis;** CPM/PERT, Network Representation, Techniques for drawing network, Resource smoothing and leveling, Project cost, Optimum project duration, Project crashing, Updating, Time estimation in PERT

UNIT IV

Decision Theory and Game Theory: Decision making, Steps in decision theory approach, Decision making under certainty, Uncertainty and under condition of risk, Decision Tree, Theory of Games, Two person zero sum game, Methods for solving two person zero sum game. **Simulation:** Basic concept of simulation, Applications of simulation, Merits and demerits of simulation, Monte Carlo simulation, Simulation of Inventory system, Simulation of Queuing system.

UNIT V

Inventory models: Inventory models – Various Costs and Concepts–EOQ–Deterministic inventory models –Production models – Stochastic Inventory models – Buffer stock.

Text Books

1. D.S. Hira and P.K. Gupta, Operations Research, S.Chand Pub.
2. H. Taha, Operations Research, PHI.
3. J.K. Sharma, Operations Research, Macmillan.

Reference Books

1. F.S. Hillier and G.J. Liberman, Introduction to Operations Research Concept and Cases, TMH
2. R.P. Sen, Operations Research-Algorithms and Applications, PHI.
3. R. Bronson, Theory and Problems of Operations Research, Schaum Series, TMH .

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
ME3EC03	Program Elective V-2 Finite Element Methods	3	0	0	3

UNIT I

Introduction to Finite Element Method: General description of Finite Element Method, Historical development Comparison with classical methods, General procedure of FEM, Applications of FEM, FEA softwares. General Field problems, discrete and continuous models, Variational formulation in finite elements, Ritz method, Weighted residual methods, Galerkin sub domain method of least squares and collocation method numerical problems.

UNIT II

Discretization and Interpolation Function: Discretization, Geometrical approximations, Simplification through symmetry, Element shapes and behavior, Choice of element types size and number of elements, Element shape and distortion, Location of nodes, Node and Element numbering. Interpolation Function: Simplex, Complex and Multiplex elements, Selection of interpolation polynomials, Convergence requirements, Natural coordinate systems, Derivation of shape functions for various elements, Iso-parametric elements, Numerical Integration.

UNIT III

Applications in structural: One dimensional elasticity, Castigliano's first theorem, Principle of minimum potential energy, Linear spring, Elastic bar with constant and varying cross sections using linear and quadratic elements, Truss structures and Beams.

UNIT IV

Applications in plane elasticity: Introduction to plane elasticity theory, Plane stress, Plane strain and Axi-symmetric problems, Finite Element formulations of plane elasticity problems using CST and four noded quadrilateral elements only.

UNIT V

Applications in Heat Transfer and Fluid Mechanics: Finite Element formulation of One-dimensional and Two-dimensional steady state heat conduction problems with convection, Simplex elements only. Finite Element formulation of inviscid and incompressible flow Potential function formulation, Stream function formulation.

Text Books

1. T. R. Chandrupatla and A. D. Belugundu, Introduction to Finite Elements in Engineering, PHI
2. D.V. Hutton, Fundamentals of Finite Element Analysis, TMH.
3. D.L. Logan, A First Course in the Finite Element Method, Cengage Learning.

Reference Books

1. B. K. Jorgen, Finite element procedures, PHI.
2. S.S. Rao, The Finite Element Method in Engineering, Elsevier.
3. O.C. Zienkiewicz, R.L. Taylor and J.Z. Zhu, The Finite Element Method: Its basis and fundamentals, Butterworth Heinmann.

Course Code	Course Name	Hours per Week			Total
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ME3EE04	Program Elective V-2 Power Plant Engineering	3	0	0	3

Unit I

Introduction to power plants & their importance, power plants concepts, types and energy conversion in each type Energy needs of India Introduction to methods of converting various energy sources to electric power, direct conversion methods renewable energy sources, solar, wind, tidal, geothermal, bio-thermal, biogas and hybrid energy systems, fuel cells, thermoelectric modules, MHD-Converter.

Unit II

Fossil fuel steam stations: Basic principles of siting and station design, effect of climatic factors on station and equipment design, choice of steam cycle and main equipment, recent trends in turbine and boiler sizes and steam conditions, plant design and layout, , fuel handling, burning systems, element of feed water treatment plant, condensing plant and circulating water systems, cooling towers, turbine room and auxiliary plant equipment., instrumentation, testing and plant heat balance.

Unit III

Nuclear Power Station: Importance of nuclear power development in the world and Indian context, Review of atomic structure and radio activity, binding energy concept, fission and fusion reaction, important nuclear fuels, moderators and coolants, their relative merits, thermal and fast breeder reactors, principles of reactor control, safety and reliability features, selection of materials for reactor component, cost structure

Unit IV

Hydro-Power Station: Elements of Hydrological computations, rainfall run off, flow and power duration curves, mass curves, salient features of various types of hydro stations, component such as dams, spillways, intake systems, head works, pressure tunnels, penstocks, reservoir, balancing reservoirs, selection of hydraulic turbines for power stations, selection of site. Safety measure in hydro electric power plant, preventive maintenance of hydro plant, Hydrology. Technical data of hydro power plants in Madhya Pradesh.

Unit V

Power Station Economics: Estimation and prediction of load. Maximum demand, load factor, diversity factor, plant factor and their influence on plant design, operation and economics; simple problems on cost analysis, economic performance and tariffs, interconnected system and their advantages, elements of load dispatch in interconnected systems. Factors affecting economics of generation and distribution of power

Text Books:

1. Power station Engineering and Economy by Bernhardt G.A. skrotzki and William A. Vopat – Tata Mc Graw Hill
2. Publishing Company Ltd., New Delhi
3. Power Plant Engineering: P.K. Nag Tata McGraw Hill second Edition 2001

Reference Books:

1. El-Wakil M.M ,Power "Plant Technology," Tata McGraw-Hill 1984
2. K.K.Ramalingam , " Power Plant Engineering ", Scitech Publications, 2002
3. G.R,Nagpal , "Power Plant Engineering", Khanna Publishers 1998
4. G.D.Raj, "Introduction to Power Plant technology" Khanna Publishers, 1995

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Course Code	Course Name	Hours per Week			Total
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ME3EM02	Program Elective V-2 Electronic Devices and Circuits	3	0	0	3

UNIT I

Semi Conductor Physics: Energy band formation in solids, classification of solids using energy band diagrams, Fermi Dirac function, Intrinsic and extrinsic semiconductors, Fermi level in intrinsic and extrinsic Semiconductors, charge densities in semiconductors, mobility and conductivity, drift and diffusion, Hall effect, continuity equation.

UNIT II

Junction Diode Characteristics: Open circuited p-n junction, Biased p-n junction, p-n junction diode, current components in PN junction Diode, diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode. Special Semiconductor Diodes: Zener Diode, Breakdown mechanisms, Zener diode applications, LED, Photo diode, Tunnel Diode.

UNIT III

Diode Applications and Bjt: Half wave rectifier, ripple factor, full wave rectifier, Harmonic components in a rectifier circuit, Clippers, clamper circuits. Junction transistor, transistor current components, transistor equation, transistor configurations, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, Ebers-Moll model of a transistor, punch through/ reach through.

UNIT IV

Bjt Biasing and Fet: Transistor Biasing and Thermal Stabilization: Need for biasing, operating point, load line analysis, BJT biasing methods: fixed bias, voltage divider bias, self bias, collector to base bias.

FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

UNIT V

Feedback Amplifier and Oscillators: Concept of Feedback Amplifiers, Effect of Negative feedback on the amplifier Characteristics. Four Feedback Amplifier Topologies. Method of Analysis of Voltage Series, Current Series, Voltage Shunt and Current Shunt Feedback Amplifiers. Condition for oscillations: LC Oscillators, Hartley, Colpitts, RC Phase Shift and Weinbridge Oscillators.

Text Books

1. Jacob Millman and Christos C. Halkias, Integrated electronics, TMH.
2. Robert Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, Pearson Education
3. S. Salivahanan, Electronic Circuits Analysis and Design, TMH

References Books

1. Adel S. Sedra & Kenneth C. Smith , Microelectronics, Oxford Press.
2. Anil K. Maini, Varsha Agarwal, Electronic Devices and Circuits, Wiley Publications.
3. Muhammad H. **Rashid**. Electronic Devices and Circuits, Cengage learning.
4. Donald A Neamen: Electronic Circuits Analysis and Design, TMH

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
ME3EL01	Program Elective V-1 Measurement & Instrumentation	3	0	0	3

UNIT I

General concepts of measurement: Definition, Standards of measurement, Errors in measurement, various systems of limits, fits and tolerance, ISI and ISO, Calibration: Static calibration, dynamic calibration, static sensitivity, range, accuracy and precision, Introduction to uncertainty, zero order, first order, and second order system.

Strain Measurement: Stress and strain, resistance strain gauges, gauge factor, strain gauge electrical circuits and multiple gauge bridge.

UNIT II

Force Measurement: Displacement measurement, Potentiometers, Linear variable differential transformers (LVDT), rotary variable differential transformer (RVDT)

Torque measurement: Measurement of torque on rotating shafts.

Vibration measurements: Working principle of Vibrometer and accelerometer, Frequency measurement.

UNIT III

Temperature Measurement: Measurement of temperature, liquid in glass thermometer, resistance thermometers – constructional details, resistance thermometer circuits, laws of thermocouples, pyrometers.

Pressure Measurement: Standards of pressure measurement, measurement of high pressure, measurement of low pressure – The McLeod Gauge.

Flow measurement: Pressure differential meters: Orifice meter, Venturi meter.

UNIT IV

Linear and Angular Measurements: Slip gauges, micrometres, vernier callipers, dial gauges, surface plates, comparators- mechanical, angular measuring instruments- sine bar, angle gauges, spirit level, autocollimators.

Measurement of surface finish: Surface finish- definition, terminology, types of surface texture, surface roughness measurement methods, comparison, profile-meters.

Metrology of screw threads and gears: Internal/external screw threads, terminology, measurement of various elements of threads, thread micrometre method, **Gears** : terminology, measurement of various elements, constant chord method, base tangent method.

CMM – Types, constructions and measurements.

UNIT V

Transducers and data acquisition systems: Classification of transducers, selection of transducers, resistive, capacitive & inductive transducers, piezoelectric, optical and digital transducers, Elements of data acquisition system – Analog to digital (A/D) and Digital to analog (D/A) converters, Smart sensors.

Electrical and electronics instruments: Principle and types of analog and digital voltmeters, ammeters, multi-meters, Single and three phase wattmeter's and energy meters,

Magnetic measurements, Determination of B-H curve and measurements of iron loss – Instrument transformers, Instruments for measurement of frequency and phase.

Text Books

1. J. B. Gupta, 'A Course in Electronic and Electrical Measurements', S. K. Kataria & Sons
2. R. K. Jain, Engineering Metrology, Khanna Publishers, New Delhi.
3. R.K.Rajput, Mechanical Measurement and Instrumentation, Katson Books.
4. C. Sujatha, Vibration and Acoustics, Tata McGraw Hill.

Reference Books

1. I.C. Gupta, Engineering Metrology, Danpat Rai Publications.
2. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw Hill.
3. B. C. Nakra, K. K. Chaudhry, Instrumentation, Measurement And Analysis, Tata McGraw Hill.
4. Robert J. Hocken, Paulo H. Pereira, Coordinate Measuring Machines and Systems, CRC Press.

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
EN3MC02	Technical English	2	0	0	0

UNIT I

Higher grammar and Vocabulary-Idioms and phrases, Antonyms and Synonyms. Modals, Narration, Voices, Clauses,

UNIT II

Reading Skills-Three -Pass system, Comprehending passage.

UNIT III

Writing skills- Precis writing, Story writing, Report writing, Paragraph writing, Unseen prose, Letter writing, Interpretation of charts, Translation- from Indian to English and vice-versa, Writing speeches, Paraphrasing

Citing resources- Editing book and Media Review

UNIT IV

Speaking Skills- Critical Thinking: syntheses, analysis and evaluation, Oral presentation, Importance of Audio-Visual aids, Speeches, Jam.

UNIT V

Soft Skills- Team Work, Emotional Intelligence, Adaptability, Leadership and problem solving.

Text books

1. S C Sharma and Krishna Mohan Business Correspondance and Report Writing at: a practical approach to business and technical communication, Tata Mc Graw-Hill Publishing Company Limited
2. A J Thomson & A V Martinet, A Prcatical English Grammar Fourth Edition, Oxford University Press New Delhi India.
3. Kalex, Soft Skills: Know yourself and know the world, S Chand & Company Ltd. New Delhi.

Reference Books

1. L Bovee Courtland, John V Thill and Mukesh Chaturvedi Business Communication Today Dorling Kindersley (India) Pvt. Ltd.
2. Ranjan Bhanu, Communication Skills, Dhanpat Rai & Co. (Pvt) Ltd Delhi.
3. P. C. Wren; H. Martin, High School English Grammar & Composition, S Chand & Company Ltd

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
EN3MC04	Human Values & Ethics	2	0	0	0

UNIT I

Human Values: Introduction, Important Human Values: Trust, Honesty, forms of Dishonesty, Courage, Integrity, Kindness, Humility, Gratitude, Hope, Perseverance, Empathy and Compassion.

Values in Engineering Profession: Safety, Risk, Accidents, Human progress; Clean, Clear, Decision Making; Community, Partnership with Nature. Commitment and Cooperation.

UNIT II

Ethics and Ethical Theories: Morality and moral systems, Introduction to Ethics, Consequentiality and Non-consequentiality theories, Hedonism, Utilitarianism, Deontological theories, Ethical Rules (with reference to W D Ross), Situation Ethics, Virtue Ethics

UNIT III

Ethics in Engineering Profession: Introduction, Historical context of ethics, Definition of Profession, Engineering and Professionalism, Professional Ethics, Engineering Ethics, Role and Responsibilities of Engineers, Working towards Safety, Sample Code of Ethics for Engineers, National Society of Professional Engineers (NSPE).

Practicing ethics as an engineering student: Plagiarism & Cheating, Academic Dishonesty and Cheating v/s Teamwork.

UNIT IV

Decisions Making: Decision Making, Characteristics of Decision Making, Advantages of Decision Making, Steps Involved in Decision Making Process.

UNIT V

Ethics in The Indian Tradition and Some Case Studies: Contribution of Moral Thinkers: Indian Moral Thinker, Western Moral Thinker. Case studies on human values and engineering ethics. Case studies on decision making in engineering ethics.

Text Book

1. Simon Blackburn, The Oxford dictionary of philosophy. Oxford University Press.
2. Anthony Weston, A 21st Century Ethical Toolbox. Oxford University Press.
3. John Hospers, An introduction to philosophical analysis. Allied Publishers Private Limited.

Reference Books

1. W.K Frankena, Ethics, PHI
2. John Hospers, An Introduction to Philosophical Analysis. Allie Publishers.
3. LaFollette Hugh, Ethics in Practice: An Anthology. Cambridge, Blackwell.